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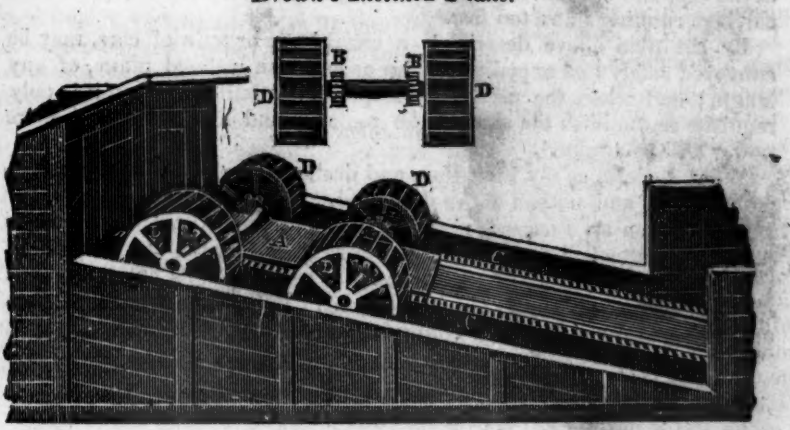
Brown's Inclined Plane.



To all whom it may concern. Be it known, that I, Gideon Brown, of the City, County, and State of New-York, have invented a new and useful machine or apparatus, called Brown's Inclined Plane, for the purpose of conveying up or down inclined planes, canal-boats, trains of railroad cars, or other heavy burthens; and I do hereby declare, that the following is a full and exact description:—

The object of this invention is to convey up or down inclined planes, where there is a small stream of water on a canal, a train of cars, a canal-boat, or any other burthen. The nature of the invention consists in applying a downward stream of water to water-wheels, or paddles, upon whose axle-trees pinions are attached acting upon a rack running beside the rails, by which means the paddles are turned in the direction of the stream, and the carriage, by means of the rack and pinion, is carried up the ascent. It is constructed in the following manner:—A sluice or rail is made upon the inclined plane, true and even in the sides and bottom, of depth and width sufficient to accommodate the paddles. Two sluices, or one only, may be made; when two sluices, as is most proper, the

railway is laid between them, upon which there is a rack, also between the rails which support the carriage; or two racks, if desirable, one upon the side of each rail. When this inclined plane is intended for conveying canal-boats, a lock is made at each end of the plane, one at the bottom to raise the boat upon the carriage, and one at the top to raise the boat to the level of the canal above. When it is intended for conveying a train of cars, no locks are necessary, the sluices run so far beneath the railroad at the bottom, that the cars can be run upon the carriages, and at the top they are taken off the carriage in the same manner.

A A, &c., in the annexed drawing, is a representation of the carriage. It is generally made with four wheels, or paddles, like those of a steam-boat; but two, or even one, will answer the purpose for light burthens.

B B, &c., the pinions which run in the rack and move the carriage.

C C, &c., the racks which are laid beside the rails, and are made either with cogs or sockets.

D D, &c., the paddle-wheels made of any appropriate form and dimensions.

E E, &c., Locks for placing on, and letting off a canal-boat.

When a burthen is to be taken down the plane, it is put on the carriage at the top, and only enough water let upon the wheels to prevent the carriage running down too fast.

By the plan above described, a canal-boat, or train of cars, may be conveyed safely and expeditiously up or down an inclined plane, of any length; and when the ascent is steep, or the burthen great, it is only requisite to diminish the size of the pinions, and less speed and more power will be attained.

What I claim as my invention, and desire to secure by letters patent, is the means and method above described, of applying a stream of water running down an inclined plane to paddle-wheels, to whose axle-trees pinions are attached running into racks, by which the burthen placed upon the axles is carried up the ascent, or retarded in its passage down. My claim is specifically to the application of the paddle-wheels, pinions and racks, to the purposes of conveying burthens upon an inclined plane.

GIDEON BROWN,
62 *Stanton-street, New-York.*

Witnesses, &c.

An Important Discovery connected with Railroads.

During the last month or six weeks, crowds of persons, evidently of a superior class of society, have, to the great surprise of the inhabitants of the quiet neighborhood of Soho, been seen bending towards, and enquiring their way to an obscure house, No 6 Carlisle-street, Soho Square. In the course of the past week the excitement has greatly increased by a vast assemblage of the nobility, members of the administration, fellows of colleges and of scientific institutions, eminent engineers, naval architects, surveyors, railroad directors, painters, and a whole host of the patrons of the arts and sciences, all of whom were (as we found out by following in the wake) attracted thither by the exhibition of a model of a locomotive steam-engine, which with other new and apparently simple inventions acting and harmonizing therewith, are destined to work the following wondrous changes and improvements in the present system of steam carriage conveyance—a desideratum and a "consummation devoutly to be wished."

'The engines and trains cannot possibly go off the railway or upset.

'They can run on any required curve with speed, safety, and a minimum degree of friction.

'They can ascend and descend all acclivities that can be required in railways, with speed and convenience.

'They are relieved of all the dead weight rendered necessary by the present system, and are no heavier than is required to bear the load of goods and passengers.

'The carriage bodies and weight will be almost on the ground.

'They will be less expensive than those at present in use; and the immense expenditure of tunnelling, embankments, cuttings, &c. will be entirely avoided.

'The repairs of the railways, the 'wear and tear' of the engines and trains, will be much less expensive than those now in use.

'The inconvenience and enormous outlay of cutting through parks or other peculiarly situated property is avoided, by the power of giving the line any desired direction.'

The ingenious inventor and patentee of this new system, which he illustrates with great clearness, is a Mr. Kollman, a gentleman well known and much respected and admired in the scientific circles. He attends in Carlisle-street, three days a week, for the purpose of exhibiting his models and engine, the latter of which has been beautifully manufactured at an expense of £300; and is on the scale of one and a half inch to a foot. It is worked by steam, and performs various and speedy evolutions upon a model railway, formed in the shape of the figure 8, which demonstrates practically its capability of moving round a circle of fourteen feet radius, besides its wonderful power of ascending a hill of one mile in fourteen acclivity. This revolution is effected by an additional forewheel on either side of smaller diameter, and concentric with the large driving wheel, the tire of which is roughened to give it necessary hold on the surface of the rail, which is elevated at the commencement of the acclivity, so as for the smaller wheel to act upon it, being also just sufficiently elevated to raise the larger wheel from the line of rail on which it previously acted.

To prevent the possibility of the engine being diverted from its course, there is a centre rail with two horizontal wheels in front of the engine which acts as a pole in the carriage, and makes its direction completely subservient to the middle or centre rail, the outward wheels running upon a plain and unconfined surface of iron. But description is almost superfluous—it must be seen to be properly appreciated: and Mr. Kollman, having protected his invention by taking out letters patent in this and other countries, is too liberal a minded man to withhold any information calculated to enliven and elevate the human mind, and too much of a philanthropist to refuse to elucidate a system which, according to present appearances, will be destined to confer permanent advantages and improvement on the present and future generations.—*Lond. Observer.*

Report from J. J. Abert, in reference to a Canal to connect the Chesapeake and Ohio Canal with the City of Baltimore.

(Continued from page 115.)

103. Arrangements for gauging were established in each brook, and the results of the daily gauging at each place, and also that of the rain which fell at the same time, will be found in the following tables.

TABLE No. 1.—EATON-BROOK VALLEY.

1835.	Rain gauge.	Falling water on an area of 6,800 acres.	Am'nt of same passing sluice fm same area.	Pr cent of dr'ge to fall.
Months.	*Inches.*	*Cubic feet.*	*Cubic feet.*	
June,.....	6·72	165,876,480	59,407,394	·358
July,.....	2·74	67,634,160	27,994,240	·414
August,.....	2·86	70,596,240	13,547,058	·192
September,.....	1·34	33,076,560	9,586,513	·29
October,.....	3·	74,052,000	20,694,551	·272
November,.....	2·20	54,304,800	23,772,620	·438
*December,.....	·96	23,696,640	36,525,544	1·541
June to Decem., inclusive,	....	489,236,880	191,528,020	·392
June to October, inclusive,	....	411,235,440	131,229,856	·319

TABLE No. 2.—MADISON-BROOK VALLEY,

1835.	Rain gauge.	Falling water on an area of 6,000 acres.	Am'nt of same passing sluice fm same area.	Pr cent of dr'ge to fall.
Months.	*Inches.*	*Cubic feet.*	*Cubic feet.*	
†Snow on ground, which fell in Nov. and Dec., 1834.	....	87,120,000		
January,.....	2·17	47,262,600	23,192,079	·491
February,.....	2·50	54,450,000	35,377,594	·649
‡March,.....	1·03	22 443,400	43,284,656	1·928
‡April,.....	5·	108,900,000	80,776,974	·741
‡May,.....	1·98	43,124,400	58,013,177	1·345
§June,.....	8·05	175,329,000	20,138,006	·115
§July,.....	3·87	84,288,600	23,141,302	·274
§August,.....	3·06	66,646,800	23,725,060	·356
§September,.....	·88	19,166,400	19,158,957	·999
§October,.....	3·86	84,070,800	19,544,880	·232
§November,.....	2·10	45,738,000	18,232,372	·399
§December,.....	·76	16,552,800	19,401,364	1·172
	35·26			
January to December inclusive, and snow.	....	855,002,800	383,986,420	·449
January to May, do do	....	363,300,400	240,644,479	·662
June to October, inclusive	....	429,501,600	105,708,205	·246

104. The foregoing are the only tables of observations of the kind that I have met with. They exhibit, in a striking degree, the remark previously made, that greater quantities of water can be collected in a cold than

* Drained the snow of November.

† Shows the quantity of water furnished by the snow on the ground when the gauging commenced.

‡ With melting snow.

§ Drainage equalized by reservoir.

in a warm climate, or in a climate having a longer winter or a greater number of months, with the ground so frozen as to lessen the filtration.

105. On examining the first table, we find that, during the months of November and December, the whole quantity of falling-water could have been collected to within two hundredths. It is also evident, from the second table, that the month of May must be taken as the latest of the months affected by the winter collection. The drainage of this month and the one preceding exceeds the falling water of both months; the latter must therefore, evidently, owe its great drainage to the accumulated deposite of the winter. These facts justify us in placing for the summer drainage of that climate, or for the drainage period in which the deposites and other effects of winter are not felt, only the months of June, July, August, September, and October. By the first table, the average drainage of these five months is 31·9 per cent.; and by the second average drainage for the same month, is 24·6 per cent.

106. Then, taking the two winter months of the first table, the average drainage is 98.9 per cent.; and again, using the same winter months of the second table, we have an average drainage of 75 per cent.

107. Although we feel bound to say that these tables are too limited to justify the establishing of any general rule, and that, for such a purpose, observation extending through many years, with the most exact measurements, can alone justify such a course; yet, at the same time, we must acknowledge the facts to be highly interesting, and deserving the confidence due to such limited observations from the just eminence of the engineer under whose directions they were made.

108. There is another remark due to the subject. The valley of a stream is not only the drain of the quantity of downfall-water, which runs into it from the surface, but also of that proportion which filtrating through the soil, finds its outlet in the bed of the stream. A deep valley, therefore, must always collect a greater proportion of downfall-water than a shoal one, although the extent of drainage be the same, as more is caught by filtration before it passes below the bed of the valley. Hence, the depth of the valley, in comparison with the edge of the drained basin, becomes an essential element in such a question. Nor can the running water of a stream be included in the result of drainage, because the stream itself is the result of the drainage; and to calculate the stream and the drainage also, is to involve the same quantity twice. It is only, therefore, at points where streams come in beyond the limit of the basin of which the drainage is included, that quantities discharged by streams can be included in or added to the quantity of water obtained.

109. We have found that in the first table the drainage per summer month was les than one-third; and, by the second table, during the same period, rather less than one-fourth. Then, taking the two winter months of the first table, or all the winter months of the second, the mean exceeds these proportions.

110. The tables of Mr. Jervis, therefore, plainly indicate a difference in the quantities collected during the summer and winter months; they also evidently show that seven months of the year is the number in which the quantity collected may be considered as influenced by the winter condition of the soil for the climate in which the observations were made. For the climate in which the canal is situated that is to be the subject of our report, if we were to allow four months as the number influenced by the conditions of winter, we presume that we will meet the case rather above than below its reality.

111. Before we go farther, it will be proper to consider the rate of rain to be accepted. Through the politeness of my friend, Dr Harlan of Philadelphia, I have been supplied with an extensive collection of rain-tables for various parts of the country; but, after giving to these the most deliberate consideration, I have come to the conclusion that the most appropriate table for our subject is the one nearest the locality of the contemplated canal, which is that of Mr. Brantz, of Baltimore.

112. The usual method of taking the average of several years' rain does not appear to me deserving of imitation; because it is well known to every engineer that, during abundant years, a vast amount of water is allowed to run to waste, that is, is discharged by wastegates from the reservoirs. To introduce this in the average of quantities collected, would be to introduce a quantity never preserved, never applied to any of the uses of the canal, and which must therefore lead to erroneous conclusions. It was probably owing to similar reflections that the board of engineers, in their report on the Chesapeake and Ohio canal, used only from Mr. Brantz's tables the rain of 1822. Under these considerations, we shall adopt for our object the rain of 1822 of Brantz's table; but, that those who differ with us on this point may have the means of calculation on a different basis, we give the entire table for nine years.

113. TABLE OF THE MONTHLY DEPTH, IN INCHES, OF RAIN AT BALTIMORE.

[*From Mr. Brantz's Tables.*]

Months.	1817.	1818.	1819.	1820.	1821.	1822.	1823.	1824.	Mean
January - -	2.25	0.90	0.70	2.80	3.30	1.80	5.60	2.30	2.85
February - -	2.80	2.00	1.90	2.20	5.40	4.80	0.70	5.90	3.225
March - -	4.50	3.00	4.55	3.30	1.70	1.30	7.10	4.30	3.71
April - -	1.50	2.10	2.70	1.10	2.10	2.10	1.80	4.70	2.20
May - -	2.60	6.45	4.10	4.40	5.10	1.50	2.10	2.95	3.65
June - -	9.10	1.15	1.30	4.60	1.80	1.50	1.60	5.03	3.66
July - -	3.50	4.10	2.20	2.20	7.50	4.35	3.60	3.37	3.85
August - -	10.40	2.00	4.30	8.00	0.30	0.80	4.10	4.50	4.30
September - -	3.30	3.20	3.00	1.50	10.70	2.25	5.80	2.94	4.45
October - -	1.80	3.10	0.70	7.80	3.40	2.50	2.80	1.77	2.975
November - -	3.70	2.00	1.10	2.70	5.60	5.10	3.10	2.27	3.20
December - -	3.60	3.60	2.20	1.90	3.30	1.20	6.25	2.25	2.90
Amount -	48.55	32.60	28.75	42.50	50.20	29.20	44.55	42.28	39.84

114. By the foregoing table it appears that, in 1822, the fall of rain was equal to 29.2 inches, say 29 inches; which would give for one acre 3,898 cubic yards. We have before remarked that the general opinion among engineers is, that one-third of the downfall-water can be collected; but, by the tables of Mr. Jervis, about two-fifths can be collected; and, in his opinion, two-fifths may be counted on with safety. The point, therefore, upon which one's judgment may hesitate, is in the adoption of one-third or two-fifths. We acknowledge that the facts in Mr. Jervis's tables have more weight with us than conjecture. It is only that his observations were of so limited a period, and that the excessive drainage of some months induces us to suspect error in the observations, that we do not at once adopt them; as, for instance, table 2—while the drainage of February and March exceeds the whole downfall-water of these two months; that of April and May,

immediately succeeding, nearly equals the downfall-water of those two months: the drainage of these four months exceeds the downfall of the four; and the downfall of the two or three preceding months is not, taking the months of the same year as stated, so excessive beyond the drainage satisfactorily to account for it, with a reasonable allowance for evaporation and filtration. There may be no error; the facts may be as stated; but, being very singular, and certainly new, we do not think they would justify the adoption of a general rule until verified by repeated subsequent observations. Now, excessive drainages are involved in the average result of both tables, which in No. 1 is 0.392, and in No. 2 is 0.449, the mean of which is 0.4205, or say two-fifths. Treating the table of Mr. Brantz, for 1822, according to our reasoning about summer and winter months, allowing four for the latter, the result would also be about two-fifths, or forty per cent.

115. But, from the remarks which we have made on the tables of Mr. Jervis, we feel unwilling at present to adopt what they would justify. Observations are now being made, in reference to the same subject, on the summit-pass of the Chesapeake and Ohio canal. These will probably confirm Mr. Jervis's results, or, in conjunction with them, furnish the profession with more positive data than it has hitherto possessed in reference to this highly interesting question. Until then we feel some doubt about the propriety of deviating from the rule hitherto generally received, that one-third or 33 per cent. of downfall-water can be collected in well-arranged reservoirs. Mr. Jervis's tables would justify the assumption of two-fifths, or 40 per cent. After all, the difference between the two is no more than seven-hundredths.

116. Applying the rule, then, which we have decided to adopt, viz: one-third of the downfall, to the rate of rain of 1822, it will give, as the quantity which can be drained into a reservoir from each acre of its basin, 1,299 cubic yards.

117. The next question refers to the loss which water experiences from evaporation and filtration, after having been collected into reservoirs. Sutcliff, on this subject, and referring to the reservoirs of the Rochdale canal, says, "In the summer months, they sink one inch per day when the cocks are shut close, and yet I think no reservoirs are more water-tight than they. But I will only estimate upon the reservoirs wasting half an inch per day, and confine it to those on Blackstonedge, as that at Hollingswork gives a certain quantity of water constantly to the mill-owners, which makes it difficult to ascertain how much it wastes," &c. It is really to be regretted that this question had not been more nicely determined, the opportunity being very favorable, as the quantity which the mills consume admits of accurate calculation. We must, however, under the circumstances of the case, be content with his rate of loss of half an inch per day, or fifteen inches per month.

118. For the same object, Andreossi applies to the reservoirs of the Languedoc canal twelve millemetres per day, equivalent to 0,472 of an inch. The coincidence between the two is sufficient to justify us in adopting for the reservoirs a loss of half an inch per day. These rates are given by both authors as actual states of loss from exposed surfaces, under the effect of rain upon them.

119. We have collected much information upon reservoirs in our own country, but it was not of a kind, either in the character of its facts or their accuracy, to be of use in the points which we have been discussing; and a reference to it would, in consequence, merely extend the volume of our report without elucidating its object.

120. Having concluded that an average rate of one-third of the down-fall-water can be collected into suitably arranged reservoirs; having shown that the drainage between winter and summer months varies considerably; and having also decided that for the climate of the contemplated canal four months may be assumed as the number affected by the condition of winter, it now becomes necessary to ascertain the effect of these considerations upon the rain assumed.

121. By the second table of Mr. Jervis, which extends through the whole number of months in the year, it appears that the summer drainage was equal to 0.246; say 0.25, or one-fourth of the downfall-water. Applying this quantity to eight summer months, and involving the remaining four for the balance of the remaining average of one-third, it will justify for these latter (the winter months) an amount of drainage equivalent to 50 per cent. of the downfall-water; rather more than the correct fractional quantity. Now, applying these considerations to Brantz's tables for 1822, we have the following results.

Months.	Fall of water.	Drained.	Quantity drained.	Quan. dr'd. per. sqr. acre
	Inches.	Per cent.	Inches.	Cubic feet.
January - - -	1.8	0.50	0.9	3267.0
February - - -	4.8	0.50	2.4	8712.0
March - - -	1.3	0.50	0.65	2359.5
April - - - -	2.1	0.25	05.25	1905.7
May - - - -	1.5	0.25	0.375	1361.2
June - - - -	1.5	0.25	0.375	1361.2
July - - - -	4.35	0.25	1.0875	3947.6
August - - - -	0.8	0.25	0.2	726.0
September - - -	2.25	0.25	0.5625	2041.0
October - - -	2.5	0.25	0.625	2268.8
November - - -	5.1	0.25	1.275	4628.2
December - - -	1.2	0.50	0.6	2178.0
Total - - -	29.2	0.333	9.575	34757.1

124. The total quantity which, by the foregoing table, may be collected in one year from one acre, is 34757.1 cubic feet, or 1287.3 cubic yards; and of this quantity it appears, that during the four months of December, January, February and March, there may be collected 16516.5 cubic feet, or 611.72 cubic yards; and during the summer months of April, May, June, July, August, September, October, and November, 18240.6 cubic feet, or 675.57 cubic yards. From which it will be perceived that the four months of winter drainage, being nearly equal to the whole drainage of the eight summer months, shows the necessity of so planning and arranging the reservoirs that the winter drainage may be collected and preserved to meet the deficiencies of the summer supply.

123. These remarks naturally lead us into considerations of the dimensions of the reservoirs—a matter, however, which more properly belongs

to the plan of the canal after its practicability has been determined. But, generally speaking, these dimensions should be adopted to fill the canal on the opening of navigation, and to maintain its trade and waste by supplying any deficiency from the summer drainage and probable drought.

124. The dimensions of reservoirs have great influence upon their usefulness. Deep and narrow valleys should always be selected for such purposes. The losses they experience are in proportion to the surface; the less the exposed surface in which the same quantity of water can be confined the better. The reader will the more readily appreciate this remark, when he understands that the surface of one mile square is sixteen times as great as a surface of one-quarter of a mile square; and if, therefore, by the fortunate position of a narrow and deep valley, a reservoir could be constructed that should not expose more than a quarter of a mile square of surface, and contain as much as under other circumstances would have to be spread over one mile square, the same mass of water would in the one case lose only one-sixteenth of what it would in the other. From which it may also be inferred, that, ftom the want of suitable positions for reservoirs, a canal may be impracticable, although the extent of surface drained would yield a sufficiency of water.

125. *Dimensions.*—As the contemplated canal is, in fact, an extension of the Chesapeake and Ohio canal to Baltimore, which would make that city one of its great terminations on navigable waters, it appears to me that there can be but one opinion in reference to its dimensions, trunk, and locks; and that these should be the same as those of the canal of which it forms so important a part. But, in consequence of the new summit to this part, the lift of the locks may be reduced, in order to adapt them the better to the probable supply of water. Such, also, appears to be the opinion of engineers Trimble, Fisk, and Hughes. The first adopts a lift of 5, the two others of 4½ feet. Preferring, of the two, the lift of 5 feet, we shall assume that in our calculations Accordingly, therefore, our reasoning will be applied to a canal 60 feet at water surface, 32 feet at bottom, and 6 feet deep; to locks, 100 feet by 15, with a lift of 5 feet, the prism of lift of which will be 7500 cubic feet, equal to 277.7 cubic yards. In adopting, however, this reduced lift, it is solely from the consideration that it may be necessary in order to accommodate the canal to the supply of water—experience having proved that, in most points of view, the best lift for a lock is from 7 to 8 feet.

126. *Practicability.*—The question of practicability, with due supply of water, depends upon the quantum of trade. A canal may be made, and there may be water enough to fill it; but if there should not be enough to sustain a reasonable degree of trade, we believe the common sense of mankind would at once decide that such a canal was impracticable.

127. For the probable extent of this trade we will refer to the extremely interesting remarks, under the head of "general considerations," in the report of the board of engineers upon the Chesapeake and Ohio canal; and a slight observation upon the facts daily developing is sufficient to demonstrate that the views of the board will soon be realized. These, however, embrace the great trade East and West, in which this canal cannot participate until the great communication is completed; but whenever completed, the extension to Baltimore must come in for a share. Its practicability, therefore, should have reference to its capability.

128. But, although participation in the great trade to the West may not soon be realized, yet we know that the line to the great mineral region of

the Alleganies is now within a year or two of being completed, and that it will be in full operation by the time the contemplated extension to Baltimore can be made. This extension will, therefore, have in the outset to subserve an extensive and established trade; in reference to which, its capability should be tried.

129. The Alleghany is the great bituminous coal region of our country with which this canal has to communicate. It would be superfluous to reason upon the amount of trade from such a region. Our periodicals are full of facts upon the subject, with which every one who can read has already been acquainted. That the demand for this mineral will soon bring the canal to the maximum of its capability, no one can doubt: and, using that principle as data, we may determine its practicability with due supply of water. The maximum of the ability of a canal depends upon the number of boats which can be passed through its locks. A medium, we shall place at half that number; a minimum, at one-fourth; and, in our judgment, the canal that does not possess a minimum ability is impracticable. Our remarks have no reference to profits. We will admit at once that a minimum ability would not furnish a profitable income upon the investment—that it would be a mere barren practicability; but there may be cases in which it may be to the advantage of the State to construct a canal, there being no other route practicable, regardless of any probability of profit from its revenue. This is a matter for the State to decide. I have to do only with the question of "practicability, with due supply of water."

130. Bare barren practicability, then, might be considered as possessed by a canal which could supply with its water all causes of waste, and be able to sustain a minimum trade. Bare practicability is not, however, the question to be decided; it is "practicability, with due supply of water." "Due supply" can have no other meaning than "adequate supply," and adequate supply must have reference to the probabilities of trade. If we suppose, then, that the commercial advantages of Baltimore would enable her to direct about one-half of the entire trade of the Chesapeake and Ohio canal to her own stores—and, without doubt, the object of the canal is to give Baltimore all that it can command of its trade—it will then be necessary to show that the canal will be able to pass at least that quantity, or we shall fail in proving an adequate supply of water. The point, then, of "practicability, with due supply of water," depends upon the question whether or not the supply will be adequate to what we have previously distinguished as a medium trade, or half the entire power of the locks with a full supply of water. Half the number of passages of a full supply, will therefore, be taken as the test of "practicability, with due supply;" and if it should appear that there is water enough for such a number of passages, adding thereto allowances for waste, I shall not hesitate to give it as my opinion that the canal "is practicable, with due supply of water."

131. Now, we will suppose that 12 boats per hour may be passed through a lock of 5-feet lift, and that the average of daylight during the ten months of navigation is 12 hours. As there is a lock at each extremity of the summit-level, there would be 24 passages per hour, or 288 per day, for the maximum ability of the extension to Baltimore. A medium ability, or that which I have considered "practicable, with due supply of water," would then be 144 passages both ways, or 72 passages each way. We will, however, for greater security, and for facility of calculation, assume 80 passages each way per day. The engineers who have previously reported on this matter, have assumed 100 passages each way; in taking

but 80 for our guide, we may be considered as treating the question with great liberality. Our reader will bear in mind that we assume 80 passages per day as no more than half the ability of a lock of 5-feet lift, with a full supply of water; and that we consider it necessary to show water enough for this number of passages in each direction, or 160 in the two directions, or we shall fail in proving the "practicability of the canal, with due supply of water," and which, we have said, should depend upon its ability to direct about one-half (rather more) of the trade of the Chesapeake and Ohio canal to Baltimore, which trade we have considered equivalent, or that it will be, to the full ability of its lock for twelve hours.

132. We have now terminated our remarks upon what we consider the preliminary questions of the case. They have extended themselves, however, into greater length than we had anticipated. We shall therefore endeavor to generalize them, and to reduce them, so that their application will be more convenient.

133. We have shown that the Languedoc canal, during ten months of navigation, loses by its filtration more than eight times its prism of water. It will not, we believe, be considered unreasonable to suppose that the prism which the canal contains at the closing of its navigation is lost during the remaining two months, and, of consequence, on the opening of navigation, this prism has to be supplied from the feeders; which will make more than nine prisms of water for the ten months of navigation. To this item must yet be added the losses from evaporation, and the leakage from the locks.

134. With such facts, we presume the inference will not be disputed, that this canal, the one which loses the least from all causes of waste of any known canal, cannot lose less, during its ten months of navigation, than ten prisms of water, or one prism per month.

135. But would it be wise to adopt, as an estimate for another canal, the losses which one of the character of this experiences? We should answer in the negative. Moreover, if our views of its evaporation be correct, as previously explained, (25,) to the nine prisms stated (in 133) as its loss from evaporation, should be added three and one-fifth prisms. Then, if we suppose the leakage from the lock-gates, and all other causes of waste, merely adequate to make up this last fraction, the whole will give, for its total loss from all causes, thirteen prisms of water for its ten months of navigation, or one and three-tenths of a prism per month. We have seen (44) that the cube of this canal, for one mile, is 64,207 yards; which, treated for the losses we have just enumerated, will make the same equal to 52.2 cubic feet per mile per minute, which, in our judgment, is not beyond the reality. The evident disposition in all the authorities to which we have referred to vaunt the advantages and lessen the defects of this canal, is continually involving the latter in minimum considerations, and, consequently, unsafe rules.

136. The board of United States engineers, in their report on the Chesapeake and Ohio canal, supposed the losses from filtration and evaporation will be one prism per month—less than what we have already seen actually takes place with the Languedoc canal. The opinion of the board appears to have been founded upon observation in reference to the Narbonne canal, which, after a use of six years, lost one and two-thirds of its prism of water; and considering the summit of which they were treating, (more tenacious in its soil than that of the Narbonne canal,) the inference drawn was, that the former would lose once its prism per month.

137. The Narbonne canal may be supposed to have reached its mini-

mum loss in six years; and the rates given are for filtration and evaporation only; that of leakage at lock-gates is not taken into account. Nor is there in our canals that care of construction, and extent of excellence in puddling, which the board evidently took into consideration in the estimate of loss of water which they gave.

138. Moreover, in the second report on the same canal, (page 54,) the board, reasoning upon a different summit, much more abundantly supplied with water than that taken into consideration in the first report—not requiring so close a calculation to show its bare practicability, and which they recommend to be adopted in preference to the first—take great pains to show that there will be 120,000 cubic yards per mile per month for the various causes of loss, exclusive of lockage. Now, as the prism of the canal of which they were treating is no more than 39,785 cubic yards in a mile, we see that the summit which they ultimately and unequivocally recommend, and for which they furnished a plan and estimated the cost, had a supply of water, exclusive of lockage, of between three and four times its prism per month, "destined (as the board themselves express it) to feed the canal, exclusive of lockage;" or, in other words, to supply water for all other causes of consumption.

139. Also, in the general opinion given in the first report of the loss of one canal prism of water for each month of navigation, consideration does not appear to have been given to the prism left in the canal, and lost while the navigation is suspended, or for the lock-gate leakage.

140. On these accounts we cannot forbear expressing it as our opinion that an allowance of one prism of water per month of navigation for all causes of exhaustion except lockage, will prove to be insufficient, and is, therefore, an unsafe rule.

141. The loss on the Erie canal, which we have found, at the least of the ascertained rates, to exceed five times its prism per month, is, without doubt, singularly great. The observations were made in 1834, when its losses should have approached a minimum. It would be considered out of place to discuss, in this report, the probable causes of so great a loss of water; nor have we, in fact, that accurate knowledge of the canal which would justify the attempt; but, as a mere opinion, we feel disposed to place much to the account of defectiveness in the original construction. Be that as it may, however, we should not hesitate to pronounce a canal as practicable that should possess a less supply: nor should we feel ourselves as doing justice to the profession of the engineer if we were to require resources of water to equal the standard of the Erie canal before we would give an opinion in favor of their sufficiency.

142. The loss for filtration and evaporation on the Chesapeake and Ohio canal has been found to be about twice its prism of water per month of navigation. Now, as this canal is the same in its dimensions as that to which our remarks are to be applied, the climate also similar, and in some degree its soil, we consider it the fairest guide for our opinion, and shall therefore adopt the results it has yielded.

143. Our reasoning, then, will furnish the following data for calculating the quantity of water that will be exhausted:

1st. The canal has to be filled.

2d. Twelve locks-full per day should be allowed for the leakage of each lock at the end of the summit-level.*

3d. Two prisms of the canal per month for losses from filtration, absorption, and evaporation.

* Annales des Ponts et Chaussees Vol. 10, p. 162.—Eight locks full per day is allowed for losses on this account.

4th. Two locks-full of water per boat, for the passage of the summit.

5th. Twelve and a half prisms of the feeders per month for loss in feeders.

I feel less confidence in the adequacy of this, than of any other item. It is taken from the experience of the Languedoc canal, in which particular care has been bestowed upon the construction of the feeders. I desire it, therefore, to be distinctly understood, that I contemplate well-constructed feeders, carefully puddled throughout.

6th. One-third of the downfall-water as the quantity which can be collected in the reservoirs.

7th. To allow a loss of half an inch in depth for each day for the water when collected. The loss on this account will extend through the whole year.

8th. And, for the locality of the canal in contemplation, to adopt a rate of rain of 29 inches per year.

144. But, after all, every candid and experienced engineer must acknowledge that these rates can be viewed only as a minimum; less would be inadequate to the object. Any unforeseen event, therefore that creates additional loss, at once throws the supply into a state of inadequacy, and produces a comparative failure in the canal. On these accounts it is the duty of every engineer, after having stated all the causes that can be appreciated which consume water, to show a proper surplus to meet unforeseen contingencies.

145. In matters admitting of much greater accuracy, because founded on more correct data—for instance, the expense of constructing the canal—does not every engineer, after having included every item which experience has suggested, then add his twelve or fifteen per cent. for accidents and unforeseen contingencies? Yet, in a matter of that kind, the error of a short estimate involves no greater evil than the expending of more money than had been at first contemplated. But, in the water for a canal, the error for a short estimate may probably make the whole expenditure of money useless. How much more important is it, then, that surplus water should be at command. The reflection becomes of greater weight when we bear in mind that, in every instance, the water consumed by canals has exceeded the amount anticipated. Even after the long considered and most cautiously pursued measures in reference to the Languedoc canal, the additional reservoir of Lampey had to be added.

146. The engineer should, therefore, show that his arrangements will procure a large surplus of water, or that a surplus is at command, by additional and appropriate arrangements, should it be required.

147. Having now completed the preliminary remarks, which appeared to me to be essential to a correct understanding of the subject, I shall proceed to apply them to the particular cases of the survey.

148. For the reasons already given, (4,) the field operations were at first confined to two routes, namely, the Linganore and the Seneca routes. These were the two upon which reports had already been made, and in reference to which the Executive of Maryland had founded a decision upon their "practicability, with due supply of water." No other survey south of these, and exclusively within the limit of the State of Maryland, had then been made; and the impression was general, that no pass existed south these and within the limits specified, the characteristics of which would vary in advantages over those which had been previously surveyed. But, from a knowledge of the country acquired by a summer's residence there, I was induced to entertain doubts of the correctness of this impression, and accordingly directed the engineers that, in addition to the renewed surveys

of the routes in question, they should also carefully examine the ridge of highland elsewhere, and determine positively whether or not any better way of passing it existed. The result exceeded my expectations. I was early informed by Mr. Kirkwood, that a route existed passing the ridge a few miles south of the former surveys, and much lower. He was required to bestow his best attention upon it. We were thus involved in the survey of three distinct lines, instead of two, as had been at first contemplated. In fact, it may be said that four lines were surveyed, as the data for two suppositions of the original Seneca route were collected.

149. I had also required the engineers to limit their operations to what might be considered the summit-section of each route; by which I mean that section which would receive its supply of water from the summit, and which includes the summit-level, and the extension of the canal each way, to points at which ample secondary supplies would be received. By this plan all the debatable ground was covered; and, by thus limiting the field-work, it would be terminated soon enough to make a report upon the point of principal interest—in fact, upon the sole point involved by the resolutions of the Legislature—in the time anticipated by the Legislature. Had the field-work been extended this season to the canal on one side, and the city of Baltimore on the other, it would have been a mere repetition of matter upon which no difference of opinion exists in reference to the practicability of the route; and which, from the delay it would have occasioned, would probably have put it out of my power to have made a report in time for any action of the Legislature at its next session.

150. Of the three lines mentioned, I shall give but a summary description, referring for a more detailed knowledge of them to the joint report of the engineers, Kirkwood and Lee, herewith appended, and from which the following facts are taken. The map attached to this report will enable the descriptions to be the better understood.

THE LINGANORE ROUTE.

151. This route passes the ridge through the valleys of Middle run and Grimes's Spring branch. Its summit is 236,076 feet below the ridge at Grimes's tobacco-house, and 530,179 feet above tide, according to the survey made by the engineer, J. Trimble. The length of the summit-section is 12 miles 714 yards, and it will first derive its secondary supplies of water from the Patapsco on the one side, and from Talbot's branch on the other. It would require a tunnel 3 miles 197 yards long, and will command a drainage of 26.98 square miles. It will admit of an arrangement of three reservoirs, namely: 1. One on Gillies' falls, with a dam 48 feet high, a surface of 71.81 acres, containing 3,475,470 cubic yards of water, and receiving the drainage of 11,202.7 acres. 2. One on Warner's branch, with a dam 38 feet high, a surface of 26.24 acres containing 1,072,056 cubic yards of water, and receiving the drainings of 3,346.447 acres. 3. One on Beaver dam, with a dam 40 feet high, a surface of 20.707 acres, containing 890,851 cubic yards of water, and receiving a drainage of 2,718.89 acres. It will also require three feeder lines, in all 3,437 yards long.

152. The total quantity of surface drained being 17,268.05 acres, at the rate of 29 inches of rain, and supposing one-third to be collected, it will yield 22,441,394 cubic yards of water, which is the extent of the supply which can be commanded for the summit-section of this route. We will now ascertain its adequacy to the wants of the canal.

153. There will be required—

1st.	To fill the canal . . .	669,575.96	cubic yards.
2d.	For lock leakage . . .	1,999,995.00	" "
3d.	For filtration and evaporation	13,391,519.20	" "
4th.	For the trade of the canal	26,666,640.00	" "
5th.	Loss in feeders . . .	1,432,183.725	" "
6th.	Loss from reservoirs .	1,896,180.000	" "
	Total quantity required .	46,056,093.885	" "
	Total quantity available .	22,441,394.298	" "
	Deficiency,	23,614,699.587	" "

154. This route is, therefore, impracticable. It will be seen that the supply is even inadequate to the wants of the locks for the trade, exclusive of every other consideration.

THE SENECA ROUTE.

155. The course of the survey led to two surveys in reference to a part of this route, varying its termination in the valley of the Seneca.

1*st case*.—It will require a tunnel 547.66 yards long; the summit-level will pass 122.47 feet below the ridge at H. Griffith's; will be 41.26 feet above the Patuxent river, at Etchinson's mill; and will be 496.26 feet above tide, according to the data of the engineer's (Trimble) survey. Our operations, as before remarked, not extending, in any route, to the termination of the canal, we have to avail ourselves of the labor of our predecessors, in order to ascertain the reference to tide-water.

The secondary supplies will be derived from the Wild-cat branch of the Seneca, and the Seneca itself, as the canal progresses, on one side; and the Cat-tail branch of the Patuxent, the Patuxent itself, and so forth, on the other. The total length of the summit-section will be 14 miles 1,193⅓ yards. It admits of the arrangement of two reservoirs.

1st. On Cabin branch, with a dam 30 feet high, with a surface of 31.253 acres, containing 1,008,420 cubic yards, and having the drainage from 2,903.68 acres.

2d. On the Patuxent, with a dam 42 feet high, with a surface of 58.05 acres, containing 2,622,312 cubic yards, and having a drainage from 8,452,080 acres. The feeders from these reservoirs will be 2,485 yards long.

156. The total quantity of surface drained being 11,445.76 acres, it would yield, at the rates stated, (152) 14,875,247.7 cubic yards of water for the available supply of this route.

157. The demands for water will be—

1.	To fill the canal . . .	792,211.971	cubic yards.
2.	Lock leakage . . .	1,999,995·	" "
3.	Filtration and evaporation	15,844,239·	" "
4.	Canal trade	26,666,64·0	" "
5.	Loss from feeders . .	1,763,313·250	" "
6.	Loss from reservoirs .	1,345,095.	" "
	Total quantity required :	48,415.494 221	" "
	Total quantity available	14,875,247.700	" "
	Deficiency . . .	33,540,246.521	" "

158. This route is, therefore, impracticable. The available quantity

amounts to but little more than half the amount required for the locks, exclusive of every other consideration.

159. 2*d case.*—The summit-level in this is the same as in the first case; the secondary supplies also the same, with the difference that Darby's branch is the first used in the valley of the Seneca. The reservoirs are also the same. The summit-section is 11 miles 73⅓ yards in length; the difference between this and the summit-section of the first case being the sole cause of difference in the demand of water between the two, it is not necessary to repeat the statement, in reference to water, in detail.

The total quantity required is .	44,295,172.107	cubic yards.
Total quantity available . .	14,875,247.700	" "
Deficiency . .	29,414,924,407	" "

160. This route is, therefore, impracticable; and, as in the first case, it will be perceived that the quantity of available water is but little more than half the quantity required for the mere use of the locks, in passing the trade.

161. I have now applied the general rules which have been determined, to the peculiarities of those lines which had been the subjects of previous report, and in reference to which the decision of the Executive of Maryland had been given, that they were impracticable in reference to due supply of water. It will be seen that I agree with that opinion, and consider them impracticable also. Whether I am right or wrong, is for others to decide. I believe myself to be right, and have fairly exposed all the reasoning upon which my opinions are founded. The facts to which my reasoning has been applied were not collected by myself, as before remarked, (8;) this duty was committed to the engineers Kirkwood and Lee, and without interference beyond general directions, and a reference to former reports on the same subject. The preliminary observations which have governed my opinions were digested and written out before the surveys were completed, and, of course, before I could have any anticipation of the opinion they might induce in reference to these surveys. My object was, to establish certain general principles, and, being satisfied with their correctness, to follow them out, no matter to what conclusions they might lead, or with whom they might compel me to differ. Difference of opinion with some one was inevitable, as engineers of deservedly great fame had already given diametrically opposite opinions on the same subject. With both, it was impossible to agree. But such differences are not unusual. In matters which, like these, do not admit of mathematical precision, they are difficult to avoid. We find accounts of them in the works of foreign engineers; and, therefore, the less surprising in our country, where a more limited experience has done so much less in settling rules for practical operations. If I have had any advantages over those who have preceded me in this matter, it has been solely in the more time at my disposal, and the greater means in my power to apply to the execution of the surveys, which have probably enabled me to collect more, and with greater care, the facts upon which an opinion can be founded.

162. It was remarked (148) that three distinct lines had been surveyed. Having reported upon two, it now remains to bring the peculiarities of the third and last to notice: we shall call this, by way of distinction, "the Brookville route," as it passes near that village.

BROOKVILLE ROUTE.

163. The summit-section of this route is 16 miles 1,506⅔ yards long, connecting, on the one side, with the Seneca, at the mouth of Whetstone

branch, and on the other with the Patuxent, at the mouth of Hawling's river. Referring to a bench-mark of Mr. Trimble's survey, near Mr. Griffith's, with which the survey of this line was connected, its summit-level is 375 feet above mean tide, and 120 feet below what has been heretofore denominated "the Seneca route," and between 8 and 9 miles south of it. The greater depression over any other surveyed route, by which this line (the Brookville route) is made to pass the intervening ridges, gives to it great advantages, particularly in reference to supplies of water. It will require two tunnels: one in passing the Rockville ridge, 2,800 yards long; and another in passing the Mechanicsville ridge, 2,600 yards long; after which it enters the valley of Reedy branch, a tributary of Hawling's river. The total length of tunnelling will, therefore, be 5,400 yards, or 3 miles, 120 yards.

164. The line will admit of an arrangement of six reservoirs, viz.:—

1st. One on the Seneca, with a dam 40 feet high, a surface of 152·66 acres, containing 4,214,955 cubic yards, and receiving the drainage from 10,908·16 square acres.

2d. One on Goshen branch, with a dam 20 feet high, a surface of 94·123 acres, containing 2,065,266 cubic yards of water, and receiving the drainage from 4,613·12 square acres.

3d. One on Hawling's river, with a dam 45 feet high, a surface of 96·648 acres, containing 2,548,450 cubic yards of water, and receiving the drainage from 6,515·2 square acres.

4th. One on the Patuxent, with a dam 50 feet high, a surface of 336·685 acres, containing 11,039,352 cubic yards of water, and receiving the drainage from 21,863·04 acres.

5th. One on Cat-tail branch, with a dam 40 feet high, a surface of 331·382 acres, containing 7,444,741 cubic yards of water, and receiving a drainage from 17,648 square acres.

6th. One on Big branch, with a dam 30 feet high, a surface of 40·404 acres, containing 900,463 cubic yards of water, and receiving the drainage from 2,497 92 square acres.

165. The dams in some of these reservoirs will admit of being raised higher, if necessary, so as to contain more water without any unfavorable extension of surface.

166. The total development of all the feeder-lines of the reservoirs amounts to 15 miles 903 yards. The feeders, however, so unite as to form but two points of connexion with the summit-level

167. The total extent of drained surface being 64,045·44 acres, it will yield at the rate of 29 inches of rain; and, on the supposition that one-third of the same can be collected, an amount of 83,229,611·09 cubic yards of available water.

168. We will now see what amount of water will be required, on the supposition of 10 months or 300 days of navigation.

1st.	To fill the canal, - -	909.774·500	cubic yards.
2d.	Leakage at locks, - -	1,999,995·000	do
3d.	Filtration and evaporation -	18 195,490 020	do
4th.	For the trade, - - -	26 666,666·666	do
5th.	Loss from feeders, - -	11,376,199·999	do
6th.	Half an inch per day loss from reservoirs, for 365 days, -	17,206,399 020	do

Total required, - -	76,354,523	cubic yards,
Total quantity available -	83,229,611	do
Surplus - - -	6,875,088	do

169. The Brookville route may therefore be pronounced "practicable, with due supply of water." In this, as well as in the other cases, the rate of loss from the reservoirs was not applied to the maximum surface when full, as given in the preceding description of the several routes, but to a reduced average surface, on the supposition of a proportionate reduction of the water in the reservoirs from the use of the canal.

170. In the investigation of the peculiarities of this route, some facts were collected leading to the probability that, from 6 to 8 miles still further south, a route might be ascertained that would reduce the tunnel length. These facts developed themselves only in the plotting of the experimental lines, and at a time when it was not possible to pursue further investigations in the field, which would have required an entire survey of a new line, with an entire new arrangement of reservoirs and feeders, and a survey of all their numerous details.

171. It will be seen that I have limited my report to the single question involved in the resolutions of the Legislature—"practicability with due supply of water." An estimate of probable cost can be made, if desirable.*

172. These surveys having cost more than had been anticipated by myself, it is proper that I should explain the causes of it. In the first place, it was not contemplated that it would be necessary to survey any other than the Linganore and Seneca routes; but, in the prosecution of these, a third (the Brookville route) manifesting itself, and with such advantages over either of the others, it was also surveyed. This last route involved as many details, and as much labor nearly, as the other two; so that the actual cost will be found not to have increased beyond the original estimate more than in proportion to the actual increase of labor beyond what had at first been anticipated.

173. In conclusion, I consider it a duty to acknowledge my obligations and thanks to Messrs. Kirkwood and Lee, the principal engineers under me, and to whom the surveys were committed, for the intelligence, the zeal, the industry, and economy with which their operations were characterized. Respectfully submitted, J. J. Abert.

December 10, 1838.

First Annual Report of the Board of Directors, to the Stockholders of the Housatonic Railroad Company.

The Report, of which we give the greater portion below, has been some time on hand, but from a want of space we have been obliged to defer its publication. We particularly commend to the attention of our readers that portion which developes the immense resources of a district as yet unprovided with any means of communication to a market. We are pleased to hear that great progress has already been made on the inspected work.

* The estimate is now being made.

OFFICERS OF THE COMPANY.

William P. Burrall, PRESIDENT.

DIRECTORS.—William P. Burrall, Edwin Porter, Samuel Simons, Stephen Lounsbury, Charles DeForest, *Bridgeport;* Anan Hine, Asa Pickett, *New Milford;* Alpheus Fuller, *Kent;* Peter Bierce, *Cornwall.*

William H. Noble, SECRETARY.

Jesse Sterling, TREASURER.

REPORT.

To the Stockholders of the Housatonic Railroad Company:—

THE Board of Directors of this Company were requested, by a resolution passed at the annual meeting of the stockholders, holden on the 3d of October inst., to publish such parts of the reports and statements submitted to that meeting, as in their discretion they should deem expedient. No official report, or statement of the affairs of the Company, from the Board to the stockholders, having ever been published, and it being difficult to select any particular items of information as being more interesting and important than others, we have deemed it advisable to present a concise history of this project, and of all the operations of the Board, from the granting of the charter, up to the present time; and at the same time to submit a few remarks upon the subject of the resources on which the road must rely for its support when completed; so that not only the stockholders may be able to form an opinion in regard to the manner in which those having charge of their interests have discharged the duties of their trust, but that also they, and all others who feel any interest in this subject, may be enabled to judge, each for himself, in regard to the present condition of the work, its future prospects, the time when its completion may be expected, and the probable productiveness of the stock, when the work shall have been completed.

The charter, under the authority of which this Company is organized, was granted by the General Assembly of this State, in May, 1836, investing the Company with all the powers usually granted to incorporated institutions of this character, and giving them authority to construct a railroad, with a single, double, or triple track from the north line of this State, adjoining the town of Sheffield, down the valley of the Housatonic river to a certain point, described in the charter, in the town of Brookfield, and thence either to tide water at the city of Bridgeport, or to the northern termination of the Fairfield County Railroad, at Danbury, or through Danbury and Ridgefield, to the western line of the State of Connecticut, to meet a contemplated railroad from Harlem, through West Chester County;—thus contemplating not only the furnishing of facilities for transportation to tide water of the immense amount of heavy articles originating in the Housatonic Valley, but also a communication, by means of railroads, between New-York and Albany; the importance of which communication, during that portion of the year when the Hudson is closed by ice, it is believed all are able to appreciate.

No active measures were taken in reference to obtaining subscriptions to the stock of the Company, till the winter succeeding the passage of the Act of Incorporation. During the latter part of that winter a careful survey of the whole route was made, together with estimates of the expense of constructing the road, by R. B. Mason, Esq., the present Engineer of the Company; and the whole expense of constructing the

road on the plan finally adopted by the Board of Directors, was by him estimated at about $1,040,000—or a little more than $14,200 per mile; the whole distance from Bridgeport to Massachusetts' line being seventy-three miles. After the completion of this survey, a proposition was made to the Commissioners appointed to receive subscriptions to the stock of the Company, to construct the whole road, as surveyed by the Engineer, for the gross sum of $936,000, and to subscribe to the stock of the Company $300,000, to be paid out of the work done and materials furnished, as estimated monthly by the Company's Engineer, the monthly estimates to be made proportionate to the above mentioned gross sum. The Commissioners were of opinion that this proposition was one deserving their serious consideration, and deemed it their duty forthwith to open the books for subscription to the Stock of the Company, although the monetary affairs of the whole country at that time were in such a condition, that even the most ardent friends of the project had but faint hopes of obtaining subscriptions to a sufficient amount to justify the organization of the Company. But they were agreeably disappointed. The city of Bridgeport, in its corporate capacity, subscribed $100,000; and, with a very limited notice, and a very short time spent, individual subscriptions were obtained in Bridgeport, and in the towns north, in the immediate vicinity of the line of the road, amounting to about $200,000 more; making in the whole a subscription of something over $600,000, inclusive of the $300,000 subscribed by the contractors. This amount, obtained almost without notice or effort, wholly within this State, and in the immediate vicinity of the line of the road, from those best acquainted with the route through which it was to pass, and with the resources on which it must depend for support, and this too at a time of pecuniary distress almost unexampled in the history of the country, furnishes a most gratifying, as well as conclusive evidence, of the confidence reposed in this project by those best qualified to judge of its merits.

The Board of Commissioners resolved, with the above-mentioned amount of subscription to the stock of the Company, to call together the subscribers and organize the Company in pursuance of the provisions of the charter, so that the stockholders, by their own agents might take upon themselves the management of their own affairs, and to postpone any further solicitation of subscriptions to the Stock of the Company, till the pecuniary affairs of the country should assume a more promising aspect.

The Company was accordingly organized, and the first Board of Directors chosen, on the 5th day of April, 1837.

The first subject which demanded the attention of this Board, was the proposition before alluded to for the construction of the road. This proposition the Board, after due deliberation and enquiry, determined to accept; and, after having taken advice of several Engineers standing in the first rank in their profession, they proceeded to make and execute a contract with Messrs. Bishop and Sykes, being aided by two Engineers of distinguished reputation, and by the most competent legal counsel, for the purpose of guarding, at every point, the interests of the Company. This contract is long and minute, containing specifications in regard to the grades and curves, and defining, particularly, the manner in which all parts of the work are to be done, and the kinds of materials to be used, and providing for all contingencies which should be anticipated, out of which difficulties might arise. In substance, however, it binds the contractors to build from the city of Bridgeport, northerly, by the route specified in the charter, to Massachusetts' line, a good, substantial and

permanent Railroad, with a single track, and with *turnouts* in addition, of sufficient number and length to accommodate the business to be done on the road. The whole work is to be done under the supervision and direction of the Company's Engineer, and to be finished, with the superstructure complete, ready to receive the cars, for the sum of nine hundred and thirty-six thousand dollars, which is to be paid as follows, to wit:—the Company's Engineer, on the first of every month, estimates the amount of labor and materials furnished upon the road by the contractors during the preceding month, and the amount of this estimate is so apportioned, that such proportion thereof as their stock bears to the whole contract price, is applied in payment for their stock, and the balance is paid them in cash. This proportion varies very little from one-third; so that one-third of the monthly estimates are applied to their stock, and two-thirds are paid in cash. Two-thirds of this stock are, by the terms of contract, not transferable till the road is completed, and the contract fulfilled; so that every month adds to the security which the Company holds in its own possession for the fulfilment of the contract. We would remark in addition, that it has been of course necessary to make frequent reference to the contract, and we have never seen, nor do we now apprehend, any reason to doubt that its stipulations are such as abundantly to guard every interest of the Company. It is also due to the contractors, Messrs. Bishop and Sykes, one of whom is a man of much practical experience in works of this character, and the other an Engineer of high reputation, to say, that in all our dealings with them thus far, they have shown a disposition honorably and fairly to fulfil both the letter and spirit of their contract, and to do all their work in the most faithful manner.

It was the intention both of the Board of Directors and the contractors, at the time of the execution of the contract, that the work should be forthwith commenced, and pushed forward with all practicable energy during the then ensuing season, but almost immediately after this time, (early in May, 1837,) it will be recollected by all, that the general suspension of specie payments by all the monied institutions of the country, occurred. This state of things seemed to call upon those having charge of the interests of this Company, to pause and consider well their situation, before embarking at such a juncture so deeply as to endanger, not only the interests of the stockholders, but also the ultimate success of the road—as any one can appreciate the difficulty of resuscitating a project of this nature, after its pecuniary affairs should have become involved in embarrassment and loss. The Board, therefore, convened under these circumstances, with (it is believed) a due sense of the responsibility resting upon them, and of the vital importance of so determining as not to prejudice the best interests of those whom they represented. They at length determined, with the assent of the contractors, that the work should be commenced upon a few of the most difficult and expensive sections, as being those which would require the longest time for their completion—(one of these being a tunnel through a rock, and another an embankment of seventy feet in height, and of considerable length,)—anticipating that, by adopting such a course, the time of the ultimate completion of the road would be but little, if any, delayed, while at the same time the greater part of the work might be postponed to another season, and then be graded, ready for the reception of the rails, at as early a period as those more heavy sections could, under any circumstances, be placed in the same condition; and that thus the necessity of making immediate and frequent calls upon the stockholders would be avoided, while the then

disordered state of the business of the country should continue. We are happy to say that the course then taken has been fully justified by the result, and that the whole line of the southern section of the road is now in a condition to be graded, ready for the superstructure, by the first of July next, which would not have been practicable had not operations been commenced as they were, upon the heavy sections during the last year. The work was commenced, as above suggested, July, 1837, and was continued upon those sections first commenced upon, during the autumn and winter next ensuing.

During the last winter, it was thought advisable to again offer to those interested in this work, a further opportunity to subscribe to the stock of the Company, though the state of the money market, and the pecuniary affairs of the country generally, was such, that no one anticipated any great amount of subscriptions, yet, as the notices given when the books were first opened were very limited, and as the information in possession of the people in this region, in regard to works of this character, was, at that time, also limited, it was supposed to be due to them, as well as to the interests of the Company to again open the books along the line of the road. They were accordingly opened at Bridgeport, and along the valley of the Housatonic at several points, in the immediate vicinity of the line of the road only. And this effort resulted in an additional subscription by the city of Bridgeport of $50,000, and individual subscriptions to the amount of about $50,000 more; so that the whole amount of the capital stock now subscribed on the books of the Company, varies very little from $705,000.

* * * * * *

The charter constituting Bridgeport a city, gave to its freemen a very liberal authority to tax themselves, for any legal purpose for which they might wish to raise money, but did not provide any specific mode by which any obligations which they might assume upon themselves, should be enforced in favor of the person or corporation to whom they might become obligated. The freemen of the city, therefore, for the purpose of placing the legality of their acts, regarding the stock of this Company, beyond a doubt, and also for the purpose of giving perfect credit to any obligations they might see fit to issue, in payment of their subscription, made their application to the legislature, setting forth all the proceedings of the city in regard to this road, and asking for the passage of an act which should effectuate their objects Upon this application an act was passed, providing that all the previous proceedings of the city, in relation to the Housatonic Railroad, be ratified, confirmed, and established, and made obligatory on the city and the citizens thereof; and also granting to the city, authority, at any future meeting, to adopt such other measures, as, in their opinion, should be necessary and proper to carry into effect their previous proceedings; and that all obligations, of any nature which they might issue for that purpose, should be binding and conclusive on the city and citizens thereof, and might be enforced and collected in the same manner, and to the same extent, that debts lawfully contracted by towns are enforced, under the laws of this state. This act, in pursuance of a provision contained in it, was submitted to a city meeting, held for that purpose, and, with great unanimity, adopted and confirmed by them.

Soon after this, the city of Bridgeport, with a liberality truly praiseworthy, and with a just sense of the importanee of this work, as connected with the interests of the city, made, through its agents, a proposition to the Company, offering to issue the bonds of the city, and deliver them

forthwith to the Company, to the amount of $50,000; and when the Company shall, by the estimates of their Engineer, have expended on their road the sum of $100,000, to deliver to them the bonds of the city for the additional sum of $50,000; and when the Company shall, in like manner, have expended $200,000, to deliver to them bonds for the further sum of $50,000, being the whole amount subscribed by the city to the stock of the Company;—conditioned, that the Company should agree to receive the bonds, and apply them, in the first place, to the payment of instalments then due on the stock owned by the city, and the balance, to the payment of future instalments, as they shall from time to time fall due; allowing to the city interest on all sums in the hands of the Company at any time exceeding the amount then due for instalments, till such sums shall be exhausted in the payment of instalments.

This proposition was accepted by the Company, and they have received from the city fifty bonds, for the sum of $1,000 each, payable to the Company or its assigns, ten years from date, with interest payable semi-annually, at six per cent., in the city of New-York. Of this sum, $30,000 have already been made available to the Company in raising money to carry on their work; and the Board of Directors see no reason to doubt their ability to negotiate the remainder, so soon as they shall be entitled to receive them, in pursuance of the terms of arrangement between the city and the Company above-mentioned, as it would seem hardly practicable to devise a better form of security for the capitalist, on which to loan his money, these bonds being payable with interest semi-annually, in the city of New-York, and having for their security, not only the pledged faith of the city, but a lien on all the property therein; and in addition to this, a power in the holder to enforce a fulfilment of their engagements by suit at law, in the same manner that an obligation can be enforced against an individual or a town.

It appeared from the reports made to the meeting of the stockholders, holden on the 3d of October inst., that the account of the receipts and expenditures of the Company then stood as follows, viz.:

The amount received from stockholders, in cash, was....		$33,986 32
The amount received from the city of Bridgeport in bonds,		50,000 00
The amount received from Bishop and Sykes, in labor done on the road and applied on their stock, according to the provisions of the contract,.....		15,105 85
Profit and loss,.....		2 00
		$99,094 17

The expenditures were, up to that time, as follows:

Cash paid Bishop and Sykes, for work done in construction of road,.....	$25,378 59	
Bonds of the city, delivered to Bishop and Sykes, as cash,.....	10,000 00	
Applied on the stock of Bishop and Sykes, as above,.....	15,105 85	
Due Bishop and Sykes on their estimates for work done for the month ending 1st October, 1838,.....	4,504 68	
Cash paid for right of way,.....	644 17	
Cash paid for engineering, including salaries of Chief Engineer and his assistants,....	3,099 25	

Cash due for engineering,.....	1,799 88	
Cash paid for incidental expenses, including expenses of obtaining the charter, organizing the Company, preliminary surveys, services of Commissioners and Directors, salaries of the officers of the Company, printing, stationery, &c.....	3,606 50	
		$65,038 92
Leaving in the treasury a balance, in cash and bonds of the city of Bridgeport, of.....		$34,055 25

Since the above report was presented, (as has been before remarked,) considerable sums have been paid for instalments, one of which had fallen due a short time previously. The avails of a portion of the city bonds have also been realized in cash, and the amount then due to the contractors and Engineers have been paid, and the treasury is now in a condition to meet all the present obligations of the Company.

During the last summer the contractors, Messrs. Bishop and Sykes, have put under contract to sub-contractors, the whole line of the road from Bridgeport to New Milford, a distance of thirty-five miles; and the report of the Engineer, which is appended to this report, will exhibit the condition of the work on the first of October inst. It appears that, at that time, a portion of the sub-contractors were then on the line, and had commenced their work, and that another portion had *not* then commenced. Since that time, all these contractors are on the line, and at work, but all are not furnished with the full number of hands which they expect to employ. The whole force now at work on the road is equal to 450 men. and is daily increasing. These sub-contractors are all bound by their contracts to have their respective portions of the road completely graded by the first of July next, which will leave ample time, during the remainder of the season, for laying the superstructure, and fitting the road to receive the cars, from Bridgeport to New Milford; and we confidently anticipate seeing the road in full operation between those places during the winter of 1839–40; and before that time, the contractors intend to put under contract, and commence the work, upon the northern section of the route, and to push forward that portion of the work with all practicable vigor.

It will be remarked that the uncertainty in regard to the total cost of construction, which usually attends works of this character, is avoided in the case of this road, in consequence of the fact that a contract is made with a single firm for the construction of the whole road, for a gross sum; which contract, by its own terms and provisions, affords to the Company abundant security for the faithful performance, by the contractors, of all their stipulations. This leaves to be estimated, only the cost of the right of way, and the ordinary contingent expenses; and with regard to the right of way, so much has already been done, by way of both arrangement and appraisal, at different points along the road, that we feel confident of our ability to estimate that item with a very great degree of accuracy. The Engineer, for the purpose of making his monthly estimates with accuracy, proportionate to the whole contract price, has divided the whole road into two sections, the northern from Massachusetts line to New Milford, and the southern from New Milford to Bridgeport, and has apportioned the whole contract price between these two sections, being guided

in this apportionment by his original estimates; and by this apportionment, the grading and superstructure complete, from Bridgeport to New Milford, are to cost the Company $450,000; consequently, the grading and superstructure of the northern division will amount to $486,000.

When, therefore, the road shall have been completed from Bridgeport to New Milford, and the cost of the right of way and all contingent expenses paid, engines and cars purchased, and the road in actual operation, the Company, without any addition to their present stock, will have at command something more than $200,000 due from the contractors and stock-holders, which will be applicable to that part of the road north of New Milford. The Company are bound by the specific provisions of their charter, after the road shall be put in operation as far north as New Milford, to proceed northerly, and construct and put in operation, at least fifteen miles thereof annually, until the whole shall have been completed.

[To be continued.]

PROCEEDINGS OF THE INSTITUTION OF CIVIL ENGINEERS, FOR THE FORMATION OF A SOCIETY OF CIVIL ENGINEERS OF THE UNITED STATES.—*Held in Baltimore, February* 11, 1839.

In pursuance of a call from Augusta, Ga., a meeting of Civil Engineers was held at Barnum's Hotel, in the city of Baltimore, on Monday, February 11th, 1839.

On motion of Mr. J. Edgar Thomson, of Georgia, Isaac Trimble, Esq. of Baltimore, was called to the chair.

The chairman having called the convention to order, laid before it the following letter from the curators of the Maryland Academy of Science and Literature.

"To Isaac Trimble, Esq.

Dear Sir:—The undersigned having been informed that a number of gentlemen, from various parts of the Union, are now in the city, for the purpose of forming an Association of Civil Engineers, beg you, in the name of the Academy, to offer their rooms for the use of the gentlemen interested in a project so intimately connected with the advancement of science. Yours, with great respect, JAMES GREEN,

For the Curators of the Md. Academy of Science and Literature."

Whereupon, on motion of Mr. C. O. Sanford, of Virginia, the convention adjourned, to meet at that hall, to-morrow morning at 11 o'clock.

Hall of the Md. Academy of Science and Literature,
11 *o'clock, Tuesday, February* 12*th*, 1839.

The convention met according to adjournment, forty gentlemen of the profession being present, from the States of Massachusetts, New-York, New-Jersey, Pennsylvania, Illinois, Maryland, Virginia, Missouri, North Carolina, Georgia and Louisiana.

The convention being called to order by the chairman of yesterday, Mr. J. F. Houston, of Pennsylvania, was appointed Secretary.

The chairman then read a letter from Wm. G. McNeill, Esq. expressing regret at not being able to be present at the meeting of the convention.

A letter of similar import from Jonathan Knight, Esq. was read by Mr. Latrobe.

The chairman having announced that the convention was prepared to go into election, on motion of Mr. Miller, Mr. Latrobe was unanimously chosen President.

The President having announced that the convention was organized, Mr. Kneass offered the following resolutions:

1. *Resolved*, That the convention now proceed to the election of a committee of *seventeen*, to prepare and adopt a constitution, and form a Society of Civil Engineers of the United States.

2. *Resolved*, That the committee meet at the Hall of the Franklin Institute in Philadelphia, at such time as they may deem convenient; and that five of them shall constitute a quorum for the transaction of business.

The first resolution being before the convention, Mr. Pickell proposed the following amendment to be added:

"And that in the selection of the members of the committee, not more than *two* be taken from each State or Territory in the Union."

At the request of Mr. Sykes, Mr. Pickell withdrew his amendment, to give way to an amendment by Mr. Trimble, which was "to strike out the number *seventeen* and insert *ten;* which was lost. The yeas and nays being called for, stood yeas 14, nays 22.

Mr. H. A. Wilson then proposed to amend by "striking out *seventeen* and inserting *five;*" which amendment was lost.

Mr. Trimble moved to amend by "striking out *seventeen* and inserting *twenty;*" which was also lost.

Mr. Pickell then renewed his amendment.

Mr. Miller proposed to amend the amendment so as to read:

"And that, in the opinion of this convention, the said committee should be so selected, that all the different portions of the Union may be represented in it, so far as is practicable;" which was concurred in, and the amendment so amended adopted.

The question being on the first resolution as amended, it was adopted.

The second resolution being before the convention, an amendment was proposed by Mr. Miller, and accepted by Mr. Kneass, specifying "the second Wednesday in April as the time of meeting."

Mr. Trimble proposed to amend by striking out all after the word "Philadelphia," and inserting, "at as early a day after the adjournment of this convention, as will suit their convenience; and that ten of their

number constitute a quorum for business," which amendment was not agreed to.

Mr. Harrison then moved to amend by adding, "but that a majority of the seventeen, expressing their assent by letter or otherwise, be required to adopt the constitution," which was concurred in, and

The question being upon the second resolution as amended, it was unanimously carried.

The convention then went into the election called for by the first resolution, pending which, the convention adjourned to 4 o'clock, P. M.

Afternoon Session.

The President announced to the convention the result of the balloting, being the election of the following gentlemen.

Benjamin Wright,	of New York,
William S. Campbell,	of Florida.
Claude Crozet,	of Virginia.
W. M. C. Fairfax,	of do.
C. B. Fisk,	of Maryland.
Edward F. Gay,	of Pennsylvania.
Walter Gwynn,	of North Carolina.
J. B. Jervis,	of New York.
Jonathan Knight,	of Maryland.
Benjamin H. Latrobe,	of do.
W. G. McNeill,	of South Carolina.
Edward Miller,	of Pennsylvania.
Moncure Robinson,	of Virginia.
J. Edgar Thomson,	of Georgia.
Isaac Trimble,	of Maryland.
Sylvester Welsh,	of Kentucky, and
G. W. Whistler,	of Connecticut,

It was then, on motion of Mr. S. W. Roberts, unanimously resolved,

"That in recording the minutes of the proceedings, the secretary be directed to place the name of Benjamin Wright, at the head of the list of the committee, he having been elected by an unanimous vote of the convention; and that the names of the other gentlemen be made to succeed in alphabetical order."

Mr. Kneass laid before the convention the following letter from the President and Managers of the Franklin Institute of Pennsylvania.

HALL OF THE FRANKLIN INSTITUTE,
Philadelphia, January 2d, 1839.

"TO BENJAMIN WRIGHT, WILLIAM STRICKLAND, SAMUEL H. KNEASS, E. H. GILL, Esquires, and other Civil Engineers.

Gentlemen:—Your communication of the 24th ult., addressed "to the President and Managers of the Franklin Institute of the State of Pennsylvania," was read at a special meeting of the board of managers, held on the 31st ult., and was referred to a committee consisting of the undersigned, who were instructed to confer with you, in relation to the project

entertained by you, of forming an "Institution of American Civil Engineers." The committee were authorized to take order on the subject referred to them; and to express the anxious desire of the Institute to promote any plan, that might appear to you best calculated to insure the success of your undertaking.

"After the free conference, which our committee had yesterday, with several of your number, we think we will best attain the objects you had in view in your application, and best consult the wishes of our own board, by the following answer to your letter:"

"Should the Civil Engineers of the United States concur in the formation of a society such as you propose; and should they decide to meet in this city, the Franklin will agree.

"1st. To furnish them all the accommodations they may desire, for the meetings of their society, or of its committees, and for their collections of books, drawings, models, &c. The details of this arrangement will be entered into, whenever it is known what extent of accommodation may be required, and a joint committee of the two bodies will have power to carry into execution all the regulations, in regard to the arrangement, disposal, and care of your books and collections, which your society may adopt.

"3d. The Franklin Institute will authorize their Actuary to accept any appointment, as secretary and treasurer, librarian, or curator, which the Society of Civil Engineers may choose to bestow upon him. Any arrangement made by the Society with the Actuary, which will be satisfactory to both, will be concurred in by the Institute. Should the duties thrown upon him, as the executive officer of the new society, consume too much time, he may (while he remains the responsible officer of both institutions) take such assistants as may be necessary.

"3d. The journal of the Franklin Institute will be open to the Society of Engineers as a vehicle of information to their scattered members; and the committee on publications will cheerfully avail themselves of the privilege of selecting, for publication in our journal, any memoir of interest, or any communication which you may not be able to include in your annual volume of Transactions.

"4th. Should the society of engineers deem it desirable, to entrust any part of their business, such as the selection of materials for their Transactions, or the superintendance of their publications, to a committee of the managers of the Franklin Institute; such a committee will be appointed by our board, and will freely give you any assistance, advice and services, that may be required.

"The charter, under which the Franklin Institute is organized, is one of a most liberal character. The objects of the corporation are stated to be, (among other things) the promotion and encouragement of the useful

arts, by all such measures, as they may deem expedient," and the corporation has all the powers necessary to justify the adoption of any measures, conducive to the objects of your society, which you may be disposed to request of them.

"We have pleasure in adding, that admittance to our rooms and collections, and, indeed, all the privileges of membership are cheerfully extended, on all occasions, to strangers visiting our city, and that therefore any engineers, arriving here, would be always welcome visiters at the Franklin Institute.

We know the views of our board, and feel ourselves authorized to pledge to you the fullest and most friendly co-operation on the part of the institute, should you select Philadelphia as the location of your society.

WILLIAM H. KEATING,
SAMUEL V. MERRICK,
JOHN C. CRESSON,
ROBERT M. PATTERSON,
CHARLES B. TREGO. } Committee.

Whereupon, on motion of Mr. Griffin, it was resolved, that the thanks of this convention be tendered to the President and Managers of the Franklin Institute, for their liberal proposition.

Mr. Roberts then introduced the following resolution:

Resolved, "That the thanks of this convention be tendered to the Maryland Academy of Science and Literature, for their courteous offer, to the convention, of their rooms in Baltimore,"—which was unanimously concurred in.

Mr. Trimble then moved, that the President be requested to notify the members of the committee not present at the convention of the proceedings; which motion was adopted.

On motion of Mr. Thomson, of Georgia, it was *Resolved*, that the President appoint a committee of five to draft an address to the Civil Engineers of the United States, and to superintend the publication of such portions of the proceedings of this convention as they may deem expedient. The President appointed Messrs. Fisk and Trimble, of Maryland, S. W. Roberts, of Pennsylvania, J. B. Jervis, of New York, and G. W. Whistler, of Connecticut.

Mr. C. O. Sanford then moved, that the thanks of this convention be tendered to the chairman of the preparatory meeting, and to the president and secretary of the convention, for the able and efficient manner, in which they have discharged their duties; which was concurred in; and the convention adjourned sine die.

BENJAMIN H. LATROBE, *President*

JOHN FREDERICK HOUSTON, *Secretary*.

Continued from page 128.

On the 20th of October last, it was correctly stated that in the project o the road from Paris to the sea, a tenth (9 millions of francs,) of the wholef capital was then lost;—of the road from Basle to Strasbourg, ten millions, &c. I have related to you heretofore that the shares in the Paris and St. Germain Road, which rose last summer above a thousand francs, had fallen nearly one-half. I offer you a brief outline of the history of the Railroad from Paris to Versailles, on the left bank of the river. Inasmuch as a million of passages were made annually, in the public carriages between the capital and Versailles for the average price of twenty sous, it was thought that by railroad, at the same charge, there would be four millions of passengers, so that each bank of the Seine might enjoy the convenience of a road with adequate profit to stockholders.

The immense increase of travelling between Paris and St. Germain, since the opening of the railroad; the same in Belgium and England; the new attractions of the Palace at Versailles; the difference of thirty or forty minutes, instead of two hours; and other considerations belonging to the great probable increase of the prosperity of that noble city, all seemed to warrant even a higher estimate of the quadruple. But dismal mistakes were committed in the professional reports concerning the cost of the left bank road. Ten millions of francs were fixed as the capital, two of them a reserve; what was deemed the most probable estimate of the whole cost gave four millions—the very highest was eight millions. One half of the road only has been finished, and the Company find that they have expended nearly eight millions, and that from five to eight millions more would be necessary to complete the undertaking. It is the common impression that the whole road would cost twenty millions. A fruitless attempt was made to dispose of the concern to the Company of the right bank. Last week, a meeting of the stock-holders was held, and the resolution adopted to seek a loan of five millions. The case has served to frighten the stockholders in the greater enterprises that have not yet broken ground;—they infer from it, that, in the long routes, the disparity between the present estimates and final expenditures would be enormous, and preclude all interest on their capitals for an indefinite term. *Sauve qui peut.* If the fall of these stocks has not been rapid of late, or if they have been stationary, this, according to the journals, means simply that no sales can be effected.

Among the best essays on the subject is one in the *Moniteur Industriel* under the title *Medicine of the Railroads.* There being a complication of maladies, the causes are explored, and the chief of these is pronounced to be the want of *election* and *publicity.* The nature of the associations is that of anonymous partnership: the stock-holders in general have not the choice of Directors; periodical and full expositions of the condition of the undertakings have not been rendered obligatory. In the case, for instance, of the Strasbourg road, the greater part of the share-holders know not the names even of the seven directors. Twenty millions of francs have been paid to the latter, and they call for half the capital; yet it is not revealed what has been done with the twenty millions. On Friday last, a meeting of a minority of the stockholders in the road just mentioned, assembled to consult, and finally appointed a committee to request the Directors to communicate information of the real situation of the enterprize, and to call a general meeting. They are understood to wish for a prompt settlement, and some of the journals blame them for acting irregularly, as the law constituting the company does not authorize voluntary or partial

meetings for any purpose. The suspension or paralysis of the undertaking is the more remarkable, as it was deemed *national* and all-important for the province of Alsace. In both Chambers, last winter, the Ministers urged the immediate adoption of the law, in order that it might be executed with the least possible delay, and anticipate the road projected on the right bank of the Rhine.

In the official report of the Directors of the left bank Road to Versailles, the excess of expenditure beyond the estimates is represented to have arisen from the very exorbitant prices which the richer class of the proprietors of the land on the route compelled them to pay. Coalitions of several hundred were formed at different points; their cupidity had no bounds. The greatest owners, to whom in the end the road would be most profitable, attempted to exact from twenty to thirty thousand francs the French acre (*arpent*;) and at Versailles, the mean price paid for the *arpent* was eleven thousand francs; that commune, or district, extorted altogether the sum of eleven hundred and forty thousand francs. I narrate these facts in order to show you how little there is here of *public spirit* in these matters. You may compare them, with the conduct so opposite of the proprietors whose donations and offers are recited in the Reports of the New York and Erie Rail Road Company. By the way, the difference between valuations of property by owners and those of neutral parties is signally exemplified in the decision of the juries of assessment in and near this capital, and in Great Britain, as to the claims for Rail Roads. In collating them, I have remarked that the former have been, commonly, four, five and six times higher than the prices fixed by the juries.

One of the most influential Democratic journals of Paris is called *Le Bon Sens.* The chief editor and his seven coadjutors have just quitted it because they could not, as "honest men," execute arrangements concluded by the proprietors of the paper with certain bodies of speculators and jobbers, to write *up* on every possible occasion several of the worst managed and least promising of the rail-road enterprises, and write *down* Lafitte and the operations of his bank. The exposition of the seceders appeared in the *National* of the 18th inst., Sunday last. They thought combinations of the kind, however usual, to dupe the public and commit direct injustice against individuals, were not perfectly consistent even with *political* rectitude. For the year past, I have seen that many of the journals were similarly enlisted, and the notoriety of this circumstance has contributed to the public distrust and the decline of the stocks. Some of the proprietors and writers of the journals are said to have demanded a heavier *douceur* of shares than the prime undertakers could venture to grant.

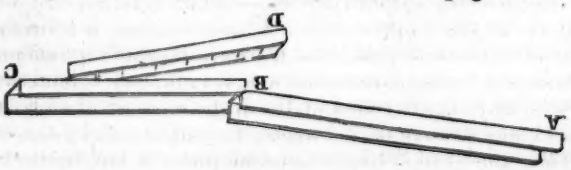
The *Journal des Debats* has taken from the outset, a large and intelligent part in the main question of the Railroads—with impartiality and independence, in my humble opinion. It recommended to the government the encouragement of Companies, and laboured to excite and enlighten the *spirit of association.* Now, while it acknowledges the deplorable pass to which they are reduced,—the extreme severity of the *crisis,* and most of the causes upon which I have touched, it vehemently repels the opinions and instances of other papers in favor of *liquidation* or abandonment, in any case. It complains of the onerous conditions to which the Companies were subjected by the Legislative acts: suggests plans of alleviation; and advises liberal appropriations in aid, by the State. See its elaborate articles of the 14th and 19th inst. I have conversed, on the whole matter, with the heads of two great Paris banking houses, who

possess the best opportunities of knowledge. They concur in the explanations of the re-action, which I have detailed. They believe that the government prescribed rates of interest too high and tolls too low for the Companies, and that the temperament and habits of the country are yet too repugnant, too distant and slow, or merely general gain.

I doubt that the Companies will be able to proceed, unless they throw themselves upon the public treasury and into the hands of the executive government; but I am sanguine that most of the enterprises will be executed in the course of a few years. The Journal *Des Debats* of the 20th inst. exclaims—"The Railroads will not perish; neither the Government nor the Chambers will allow it." The importance of them for political and commercial interests is diffusely and deeply felt; the Government may avail itself of the general impression and the really strong impulse which all the circumstances, good and bad, have produced. It is already calculated, on one side, how far, by the extension of the Railroad and Canal communications, France may be the more effectively and easily ruled; and, on the other, how much less difficult it will be for the people to render themselves truly *sovereign*. I found, however, in traversing France, the notion widely spread, that all that is projected or shall be accomplished is intended and will operate, exclusively, or in far the greater measure, for the prosperity and supremacy of Paris.

It is rather too early to travel in France, or on this continent generally, with a view to cheapness and despatch. Five or ten years hence, present schemes of railroads, canals, steamboat lines, will have been executed, with a marvellous reduction of present obstacles, and much too tempting a multiplication of facilities for journeys through every part of Europe and to the old East of Asia and Africa.

Proposed Ship Canal across the Isthmus of Panama.—The following resolution, accompanied by a report and voluminous appendix, interspersed with sundry maps and diagrams, was presented to the House of Representatives from the Committee on Roads and Canals, by Mr. Mercer, on Saturday, the 2d instant. The resolution was adopted by the House, and the report, &c. ordered to be printed:

Resolved, That the President of the United States be requested to consider the expediency of opening or continuing negotiations with the Governments of other nations, and particularly with those, the territorial jurisdiction of which oomprehends the Isthmus that connects North and South America; and to which the United States have accredited ministers or agents, for the purpose of ascertaining the practcability of opening a communication between the Atlantic and Pacific Oceans by the construction of a Ship Canal across the Isthmus; and of securing forever, by suitable treaty stipulations, the free and equal right of navigating such Canal to all nations, on the payment of reasonable tolls.

Representation of the "Tom," alluded to page 98.